

**A) AMENDMENTS TO THE CLAIMS**

1. (Currently Amended) A method of processing seismic data corresponding to first arrival waves and to waves reflected or converted by the seismic horizons, the seismic data being acquired by ~~means of a~~ an omnitilt sensor having at least three geophone components with an angular orientation  $\phi\psi$ , wherein estimators are determined which are combinations of these components, wherein various data are isolated, through the estimators, depending on whether they correspond to propagation with reflection or with conversion by the seismic horizons, and wherein operators to be applied to the various components of the sensor are determined for determining a sensor reconstruction, the operators being those that minimize a deviation between reference data and data obtained by applying the estimators to the sensor reconstruction, the operators thus determined being applied to the data acquired,

said operators used to reconstruct the orientation of at least one geophone of the omnitilt sensor along at least one desired axis.

2. (Previously Presented) A method according to Claim 1, in which, the sensor furthermore including a hydrophone, the reference data for reconstructing a vertical geophone are derived from the data acquired by the hydrophone.

3. (Previously Presented) A method according to Claim 1, in which the reference data for reconstructing a vertical geophone without hydrophone or for reconstructing horizontal geophones are derived from the application of the estimators to one of the geophones of the sensor.

4. (Previously Presented) A method according to Claim 1, wherein the orientation in the horizontal plane of geophone component is obtained by minimizing the estimator of the transverse reflection.

5. (Previously Presented) A method according to Claim 1, wherein the estimators are determined as a function of a model of isotropic propagation or including the azimuthal anisotropy.

6. (Currently Amended) A method of processing seismic data acquired by means of a sensor having at least three geophone components, determining estimators, wherein said estimators are determined which are combinations of these components, wherein various data are isolated, through the estimators, depending on whether they correspond to propagation with reflection or with conversion, said estimators used to reconstruct the orientation of at least one geophone along at least one desired axis.

7. (New) A method of processing seismic data, at least a portion of said data comprises first arrival waves and waves reflected or converted by the seismic horizons, the seismic data acquired by an omnitilt sensor having at least three geophone components, each geophone component has an angular orientation  $\phi\psi$ , said method comprises the steps of:

determining estimators, wherein said estimators comprises combinations of said geophone components;

isolating at least a segment of said data using said estimators, said isolation depends on whether said portion of said segment corresponds to propagation with reflection or with conversion by the seismic horizons;

determining operators for obtaining a sensor reconstruction, wherein said operators are determined to minimize the deviation between reference data and data obtained by applying the estimators to the sensor reconstruction; and

applying said determined operators to the acquired seismic data, said application used to reconstruct the orientation of at least one geophone along at least one desired axis.

8. (New) A method according to Claim 7, wherein the sensor further comprises a hydrophone, said method further comprises the step of:

deriving the reference data for sensor reconstruction of a vertical geophone from the data acquired by the hydrophone.

9. (New) A method according to Claim 7 further comprises the step of:

deriving the reference data for reconstructing a vertical geophone without a hydrophone or for reconstructing horizontal geophones by applying the estimators to one of the geophones of the sensor.

10. (New) A method according to Claim 7 further comprises the step of:  
obtaining the orientation in the horizontal plane of geophone component by minimizing  
the estimator of the transverse reflection.

11. (New) A method according to Claim 7, wherein the estimators are determined as  
a function of a model of isotropic propagation or including the azimuthal anisotropy.